

In the Claims

Claims 1-83 (Canceled)

84. (New) An implantable hyaline cartilage construct comprising a collagenous porous support matrix having pores between 100 and 300 μm , seeded with chondrocytes activated in a tissue processor with a cyclic or constant hydrostatic pressure between about 0.5 MPa and 5 MPa above atmospheric pressure, applied at a frequency between 0.01 Hz and 2.0 Hz for about 1 hour to about 30 days, followed by a resting period of about 1 day to about 60 days, under perfusion with a perfusion medium at a rate of perfusion flow between 1 μL and 500 $\mu\text{L}/\text{minute}$ and under oxygen concentration between 1% and 20%, said activated chondrocytes synthesizing an extracellular matrix, sulfated glycosaminoglycan (S-GAG) and DNA, wherein said activated chondrocytes synthesize at least 50% more of S-GAG and 49% more of DNA than control, non-activated chondrocytes.

85. (New) The construct of claim 84 wherein the chondrocytes are activated with the cyclic or constant hydrostatic pressure of about 3.0 MPa, applied at a frequency of about 0.5 Hz, for about 7 to about 14 days, followed by the resting period of about 7 days to about 28 days, under perfusion flow rate between 5 μL and 50 $\mu\text{L}/\text{minute}$ and under oxygen concentration of between 2% and 5%.

86. (New) The construct of claim 85 wherein said collagenous support matrix is prepared from Type I collagen or Type II collagen.

87. (New) The construct of claim 85 wherein said support matrix is a sponge or honeycomb-like lattice.

88. (New) The construct of claim 87 wherein chondrocytes are seeded in the support matrix at a cell density between about 12 and 15 millions.

89. (New) The construct of claim 85 wherein said chondrocytes are activated under the perfusion flow rate from about 1 to about 50 μ L per minute.

90. (New) The construct of claim 85 wherein said chondrocytes are activated at an oxygen concentration of about 2%.

91. (New) The construct of claim 85 wherein said tissue processor is a Tissue Engineering Support System (TESS™) culture unit.

92. (New) The construct of claim 85 wherein said chondrocytes are activated with a cyclic or hydrostatic pressure of about 0.5 MPa.

93. (New) The construct of claim 85 wherein said chondrocytes are activated at the perfusion rate of about 5 μ l/min.

94. (New) The construct of claim 85 wherein said chondrocytes are activated at about 5% concentration of carbon dioxide.

95. (New) The construct of claim 85 implanted into a cartilage lesion.